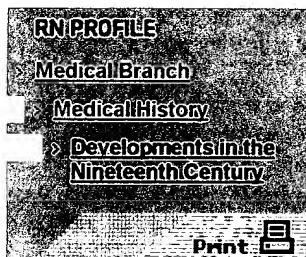


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## ROYAL NAVAL MEDICAL SERVICE

### Developments in the Nineteenth Century

#### Progress

There was an enormous decline in the incidence of sea diseases in the nineteenth century - so great that before its close sickness had fallen almost to the low level it stands at today. The proportion sent to hospital in all parts of the world in 1782 was as high as 1:3.3. In 1795 it was 1:4, but by 1813 it had fallen to only 1:10.75 which is one-third of the sickness prevailing in 1782. There was an increase in 1819 to 1:8.8, and in 1829 to 1:8.9, but this was due to the great prevalence of yellow fever at the time. In the 'Health of the Royal Navy of 1862' it is stated that:



*'... a very large proportion indeed of the sick rate in the Royal Navy is derived from boils, abscesses, ulcers and injuries of a more or less trivial nature, and from simple catarrhs and sore throat, and that the ratio of sickness from disease properly so called is in reality very small.'*

The death rate likewise fell dramatically and continued to fall in the next century as these figures show:

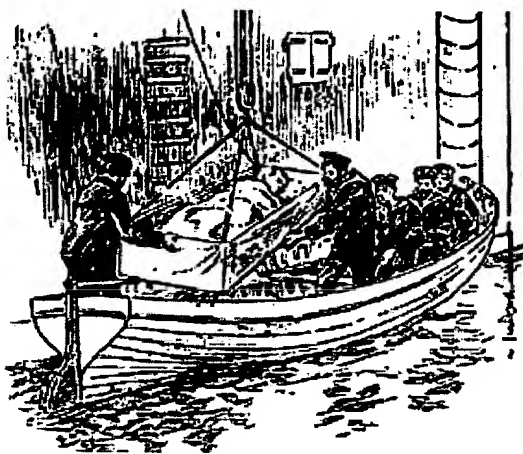
Dates	Death Rate per 1000 sailors
1856 to 1860	14.34
1861 to 1870	8.27 (introduction of the iron ship)
1871 to 1880	5.86
1891 to 1900	4.19
1924 to 1926	1.51

#### More progress

Even as early as 1800, when the Fleet blockaded Brest, it consisted of 24 ships of the line, besides smaller vessels, under Lord St Vincent, and kept at sea from 27 May till 28 September without one of

them being in port. The history of the fight against disease at sea clearly shows how it was the great improvements in naval hygiene and preventive medicine rather than the advances in clinical medicine that reduced mortality and sickness; but during the nineteenth century other important factors were operating; they included the following:

- a. Fewer wars during this century and a consequent reduction in the naval force.
- b. Changes in the method of recruitment. After 1815 impressment as such ceased and was replaced by voluntary recruitment continuous service in 1823, and so many of the hard restrictions, such as no shore leave, could be abolished.
- c. Many of Blane's recommendations were brought into effect, such as improved cleanliness and inspection by commanding officers.
- d. Thorough cleansing of clothing of men suffering from infection.
- e. By 1815 water was stored in iron tanks which were cleaned and whitewashed inside.
- f. Victualling was reorganized and catering taken out of the hands of private contractors and controlled by a Director of Victualling. The art of canning was first tried out in the Navy in 1814, and fresh beef and vegetables added to the diet. Salt beef and pork were only issued when these were not available. Fresh bread was substituted for biscuits and allowances of tea, sugar and chocolate made. The spirit ration was reduced; formerly the issue was beer, but when this was not available each man received one half pint of spirits in lieu in the form of brandy or rum. This was reduced to one quarter pint in 1825 and again to one eighth pint in 1850. Sick messes and medical comforts were instituted in 1835.
- g. The introduction of steam into ships was through the stages of sailing ship and auxiliary steam engine, composite wood and iron sailing steamship, all- iron sailing steamship and finally the iron ship propelled by steam alone. The introduction of steam led to great improvements. The old windsail and fixed cowls fitted in the latter days of sail were inadequate and the steam fan provided a far better means of ventilation. Cold storage compartments became available and steam ensured an adequate supply of drinking water by distillation and a better system of heating. Later the development of electrical power provided good lighting, improved heating and the modern system of ventilation by the plenum system.



### Setbacks

Small outbreaks of scurvy persisted from time to time in the nineteenth century, still due to ignorance but also to the unfortunate substitution of limes for lemons. From 1860 preserved lime juice was made the official antiscorbutic and this led to a serious outbreak in 1875 in the *ALERT* and *DISCOVERY* in the Arctic. To bring the long story of scurvy up to date it should be added that even during the last war there were reports of preclinical or subclinical states of scurvy among some ships, especially submarines on long patrols in the Arctic when no fresh provisions could be provided. An investigation, however, showed that all cases of bleeding gums reported were in fact due to Vincent's angina, and there was no evidence of scurvy. The lemon and orange juice now issued to the Navy is fortified with ascorbic acid up to 0.4 per cent.

And finally it was a naval surgeon who gave his name to a well-known drink when he persuaded naval officers to put lime in their gin and it has been called a 'Gimlette' ever since.

### Statistical information

Careful statistics of the incidence of disease were now being kept and were issued regularly as reports on the 'Health of the Navy'. Gilbert Blane wrote 'A brief statement of the progressive improvement of the health of the Royal Navy at the end of the eighteenth and beginning of the nineteenth century', which was published in 1830. The report on the 'Health of the Navy' by John Wilson for the years 1830 to

*Sharyn Ngata*

1836 was published in 1841. In this the incidence of disease was given separately for the different commands at that time - the South American, West Indian and North American, Mediterranean and Peninsular commands. In this report Wilson gives perhaps the first recorded instance of industrial disease in the Navy, when he describes the methods of cleaning decks. He writes:

*'The ordinary methods employed are washing, wet and dry stoning. In the first, large quantities of sea water with friction by brushes is used; in the second, a small quantity of water is poured on the decks, which are then diligently rubbed with smooth, flat stones generally of sandstone designated holy-stones by the seamen, for the purposes of removing stain spots, grease, etc. In the third, the same kind of stones are used for rubbing, but instead of water they are applied directly on the decks...'*

Wilson goes on to comment on the objections to wet washing between decks but also observed:

*when very friable (sometimes calcareous) stones are employed, a good deal of dust is disengaged in the process which irritates the eyes, settles on the clothes and insinuates itself into the chests, bags, etc, and is therefore to a certain extent annoying.'*

He was of course referring to the sea chests of seamen and not to the lungs, but considerable quantities of dust must also have been inhaled.

### Psychology

Wilson had some very modern notions on the concept of social medicine and the reaction of the mind on health. He considered that a happy and cheerfully occupied state of mind was conducive to the preservation of health, while gloom and discontent, the offspring of the want of innocent and healthy occupation lead to its subversion. He thought that more was needed in the training and instruction of the mind than issuing bibles, prayer books and religious tracts. About this time libraries were in fact established in ships and a fit person appointed to give elementary education. Wilson concludes his report:

*'The time has passed when utter ignorance of everything but his immediate duty, with all the debauchery and destructive effects of savage ignorance, is thought essential to the character of a British seaman - implicit obedience, indomitable courage and love of country.'*

### Summary

At the close of the eighteenth century and during the nineteenth there were remarkable changes in conditions of life for the seaman and a great fall in the incidence of disease. As early as 1840 Wilson wrote:

*'Of the many improvements which have taken place within the last 50 years in the physical and social condition of the people, none is to be compared with that effected in the health of seamen in the public service, because none approached it in magnitude and importance.'*



Stressing this wider aspect of medicine, Macdonald Critchley, in his Croonian lecture in 1945 said:

*'Naval medicine can be visualized as the closest approximation to what we now choose to call social medicine, for in the Service the total environment of our personnel comes under the close study and care of the medical branch.'*

Extract from BR 2193 "Handbook for Royal Navy Medical Officers". Articles 0101 to 0107.

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## Vitamin C

### Alternative Names

ascorbic acid

### Definition

Vitamin C is a water-soluble vitamin. Water-soluble vitamins are carried throughout the body in the bloodstream. They are, for the most part, not stored in the body. The body uses what it needs and the rest is passed in the urine.

### What food source is the nutrient found in?

The best sources of vitamin C are fruits and vegetables. Citrus fruits such as oranges, grapefruit, and tangerines are excellent sources. Other good sources of vitamin C are as follows:

- broccoli, cabbage, and brussels sprouts
- melons, kiwifruit, and strawberries
- sweet peppers, potatoes with skin, and tomatoes

Here are some guidelines for eating fruits and vegetables with a high vitamin C content.

- Choose fresh or frozen fruits and vegetables over canned products.
- Cook vegetables only for a short time in a small amount of water.
- Eat raw vegetables.
- Eat sliced fruits and vegetables shortly after they're cut.
- Keep fruits and vegetables refrigerated, and eat them while they're fresh.

### How does the nutrient affect the body?

Vitamin C is important to many body functions. It helps the body do the following:

- build and maintain collagen, which are fibers that connect tendons, ligaments, bones, and cartilage
- heal wounds and bruises
- keep the immune system healthy
- maintain healthy bones, teeth, gums, red blood cells, and blood vessels
- repair bone fractures

Vitamin C may reduce the risk of certain chronic diseases by acting as an antioxidant. Antioxidants help the body fight the

effects of free radicals, which can damage the body's cells.

### Information

Scurvy is a disease caused by a deficiency of vitamin C. It causes open sores in the mouth, loose teeth, and soft gums. In the 1700s, it was discovered that sailors who often drank lime juice did not get scurvy. ~~Sailors who did not drink lime juice had a~~ 50% chance of dying from scurvy. It was not until 200 years later that vitamin C was found to prevent scurvy.

Severe deficiency of vitamin C can lead to scurvy. However, severe deficiency and scurvy are rare in developed nations. Vitamin C deficiency is often caused by the following factors:

- a diet that does not include enough fruits and vegetables
- excess alcohol intake
- smoking
- stress

Pregnancy, breastfeeding, gastrointestinal diseases, and hyperthyroidism increase the need for vitamin C. Inflammatory diseases, burns, and surgery can also increase a person's need for vitamin C.

Following are signs of vitamin C deficiency:

- inflamed gums
- reduced resistance to colds and infections
- skin problems
- slow wound healing
- stomach disorders

Consuming more than 2,000 mg per day of vitamin C can cause stomach upset and diarrhea and possibly other adverse effects. It is not known for sure if mega doses of antioxidants, such as vitamin C, can help decrease the risk for chronic diseases. Much of the current information is conflicting. More research is needed. In a recent review of current studies, it was suggested that an intake of 90 mg per day provides the optimal health benefits related to heart disease and cancer.

It is unclear from studies whether physical activity increases a person's requirement for vitamin C. There is no substantial evidence that mental or emotional stress increases the need for vitamin C for healthy people.

Many studies have been done to determine the effect vitamin C has on the common cold. Review of these studies shows that larger doses of vitamin C, 500 mg per day to 1,000 mg per day, for example, have no significant effect on preventing colds. These doses may, however, reduce the duration and severity of a cold for some people. This may be because at high doses, vitamin C may act like an antihistamine.

The recommended dietary allowances, or RDAs, for vitamin C are 75 mg per day for women and 90 mg per day for men. Smokers are advised to consume an extra 35 mg daily. This is because smoking depletes the body of some vitamin C. The RDA for pregnant women is 85 mg per day. Women who breastfeed should consume 120 mg per day. The Third National Health and Nutrition Survey, also called NHANES III, showed that 11% of nonsmoking women and 21% of nonsmoking men in the United States do not get enough vitamin C.

Because vitamin C cannot be stored in the body, it is important to eat foods rich in vitamin C daily. Eating a well-balanced diet, including at least five servings of fruit and vegetables every day, should provide all the body needs.

**Author:** Susan Harrow Rago, RD, MS

**Date Written:** 06/07/01

**Reviewer:** Barbara Mallari, RN, BSN, PHN

**Date Reviewed:** 06/11/01

Potential conflict of interest information for reviewers available on request



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## Diet and Nutrition

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### Low Vitamin C Increases Stroke Risk

#### Half a Glass of OJ a Day May Fight Strokes

By Jennifer Warner

Reviewed By Gary Vogin, MD

WebMD Medical News

June 7, 2002 — Need another reason to juice up your morning routine? As little as a half a glass of orange juice a day may be enough to help prevent a stroke. A new study shows not getting enough vitamin C in your diet can increase the risk of stroke, especially among men with high blood pressure or who are overweight.

Researchers found that men with the lowest levels of vitamin C in their blood were nearly two and half times more likely to have a stroke than were men who had the highest levels of vitamin C in their blood. And the risk grew if the man had high blood pressure or was overweight.

The complete report appears in the June issue of *Stroke: Journal of the American Heart Association*.

Although previous studies that looked at whether vitamin C protects against stroke have not been very convincing, study author Sudhir Kurl, MD, of the Research Institute of Public Health in Finland, says this study is different. Rather than measuring vitamin C intake from supplements and dietary sources as in prior studies, they measured the amount of vitamin C actually circulating in the blood in 2,419 men who were followed for about 10 years.

"Other studies analyzed on the basis of fruit and vegetable intake, but we did our study on the basis of [blood concentrations of] vitamin C, which we consider to be a better marker of the availability of vitamin C in the body," says Kurl.

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Researchers say vitamin C is a potent antioxidant that may work to reduce the risk of stroke in a number of different ways. As an antioxidant, it reduces the effects of damaging substances in the body known as free radicals, which have been linked to heart disease, cancer, and stroke. In addition, vitamin C helps protect the arteries against damage and lowers blood pressure and cholesterol levels.

Kurl says older adults may benefit most from the findings of this study by increasing their daily dose of vitamin C and eating a well-balanced diet rich in fruits and vegetables.

"Stroke is a disease of older people, and they are the ones that are suffering the most. And many of them are not eating a well-balanced diet," says Kurl. "A minimum of a half glass of juice [that contains vitamin C, such as orange juice] per day could contribute to this reduction in risk."

Registered dietitian Jo Ann Hattner, spokesperson for the American Dietetic Association, agrees that incorporating more vitamin C rich foods is the best way to get the most out of this powerful vitamin.

Both Hattner and Kurl say previous studies have shown that taking vitamin C supplements doesn't necessarily have the same protective effects as getting your daily dose of vitamin C from fruits and vegetables.

"We like to think that vitamin C in natural sources has some special synergy and works with other elements in the food to make it more effective in creating a line of defense," Hattner tells WebMD.

"The problem with the elderly is that they may not want the acidity in their diet and may avoid orange juice," says Hattner.

Acidic foods, such as citrus fruits, can cause heartburn or acid reflux (a back-up of stomach acids into the esophagus) in some people. But Hattner says eating or drinking citrus products with other foods can minimize this effect.

Even squeezing some lemon or lime juice on ~~salads or vegetables~~ can add an extra dose of vitamin C to your diet, suggests Hattner. Other, lesser-known sources of vitamin C that people often overlook include strawberries, cantaloupe, papaya, broccoli, and cabbage.

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